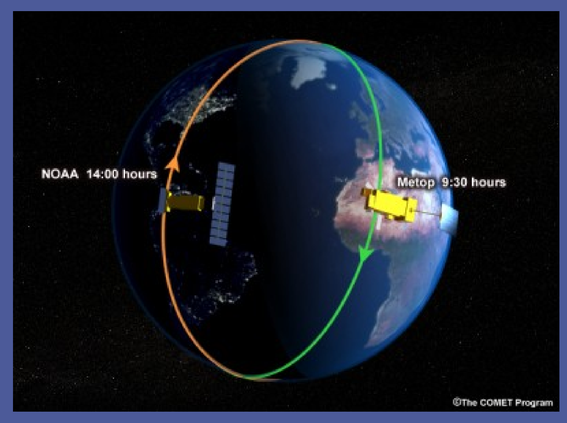
The Concordiasi project over Antarctica

Florence Rabier, A. Bouchard, V. Guidard, F. Karbou, V.H. Peuch, N. Semane (Météo-France/CNRS)
Ch. Genthon, G. Picard (LGGE)
F. Vial, A. Hertzog (LMD)
Ph. Cocquerez (CNES)
S. Cohn, T. Hock, V. Salazar (NCAR),
L. Avallone, L. Kalnajs (UC Boulder)
T. Deshler (U Wyoming)
J. Haase (U Purdue)



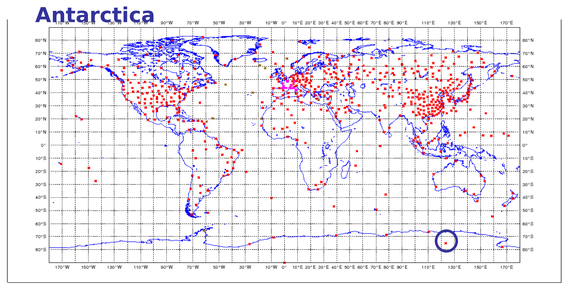
The Context

The Concordiasi Experiment
A joint French-US initiative
With International collaborat

- **Belongs to the THORPEX-IPY cluster (N°121 in IPY)**

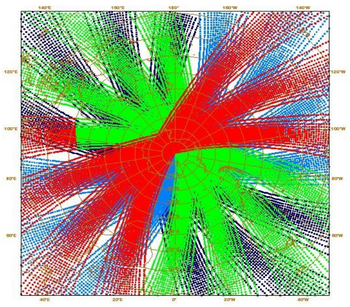
Scarcity of conventional data over the poles

Concordia: new French-Italian station in Antarctica

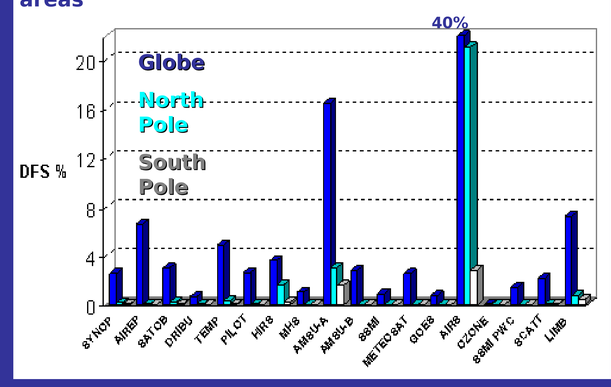


MetOp spacecraft launch in October 2006.

Very good satellite data coverage over the polar areas



Large impact of satellite data over the polar areas



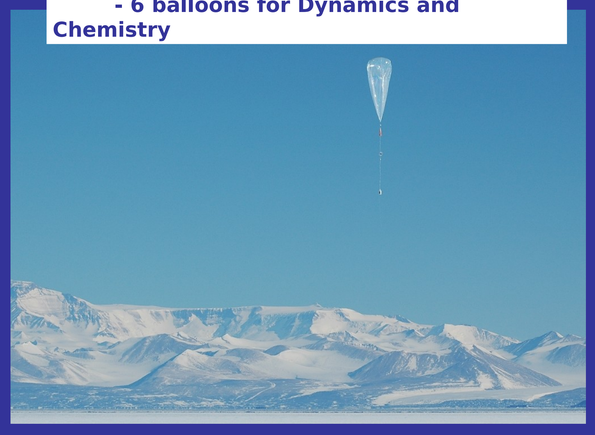
Courtesy ECMWF

Goal and Field campaign

Validate the assimilation of IASI and other sounder data over Antarctica
Field campaign in Sept-Nov 2010

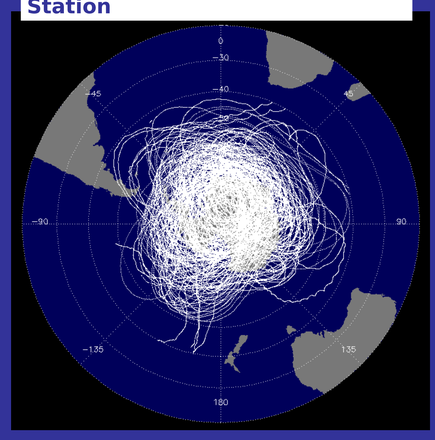
- **Flotilla of CNES long duration balloons launched from McMurdo Station with:**
  - **Driftsonde system from NCAR**
  - **Extra stratospheric measurements (aerosols, gravity-wave activity, ozone) to better understand stratospheric clouds and chemistry processes.**
- **Ground-based observations over Concordia**

18 Superpressure Long-duration balloons drifting several months at 20kms:
- 12 balloons (for a total of 600 dropsondes)
- 6 balloons for Dynamics and Chemistry



Trajectories during previous Vorcore campaign (2005)

Launched from McMurdo Station



Concordia Station: Ideally located to validate analyses inland

Scientific plans

Issues for an optimal assimilation of IASI

- **Cloud detection**
- **Bias correction**

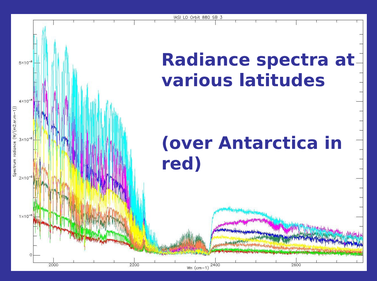
To better assimilate microwave observations over snow-covered areas

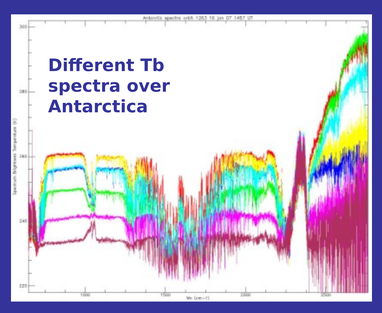
Work on microwave surface emissivity
- **Retrieval from data**
- **Modeling using a snow model**

Evaluate impact of improvements on local forecasts, chemical-transport models and lower latitudes.

IASI signal weaker over Antarctica

But signal clearly visible





Courtesy CNES

Temperature profiles very different from other latitudes can cause problems

Clouds over very cold surfaces can often appear warmer compared to the underlying surface. This is the opposite signal many cloud detection schemes are looking for.

Similar difficulties to detect the 11 micron infrared image from MODIS **Stratospheric clouds**

warm cloud

cold surface

Microwave emissivity highly variable in space and time

http://www.cnrm.meteo.fr/concordiasi/

NSF, NCAR, U. Wyoming, Purdue U., UC. Boulder, UMBC/GMAO USA
CNES, IPEV, LGGE, LMD, Météo-France France
ENEA, PNRA, CNR Italy
ECMWF International
Bureau of Meteorology Research Centre Australia

METEO FRANCE
Toujours un temps d'avance